The Growth and Development of Mosquitoes in a Microgravity Environment

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Mission Purpose

- Determine:
  - Changes in life cycle
  - Changes in behavior

Broader Purposes

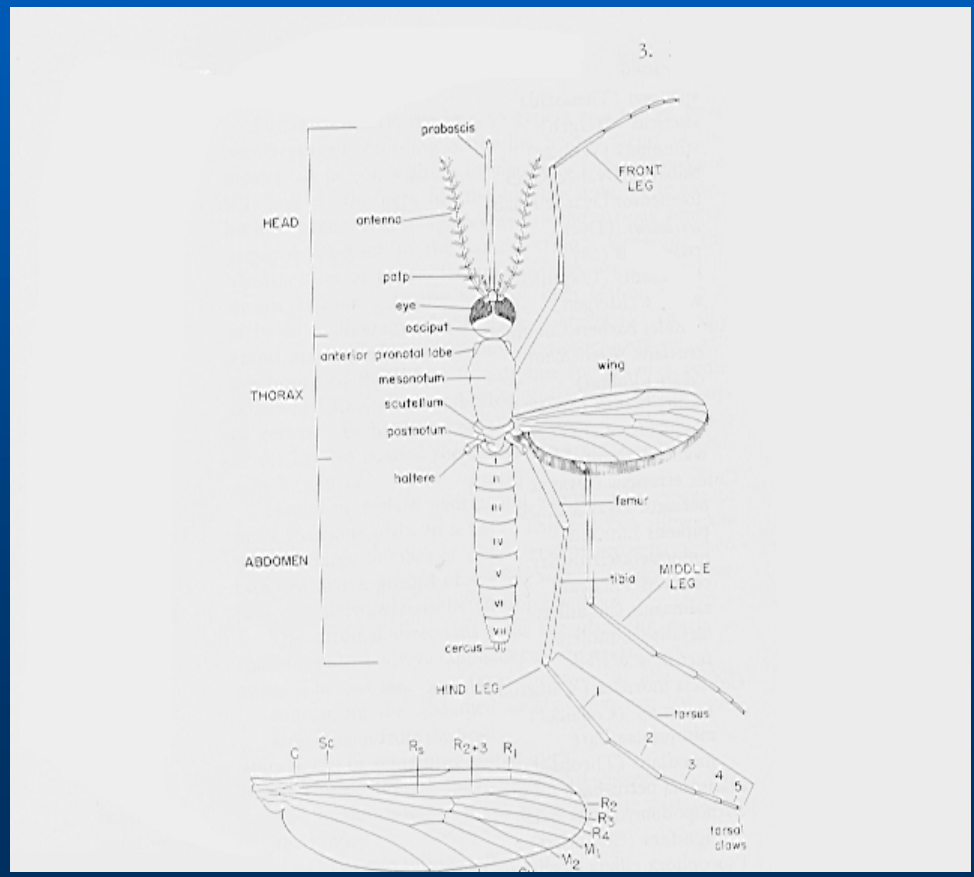
- Advance knowledge of insects
- Representative of other insects
- Physiological and behavioral data in microgravity conditions

Roles of Insects in an Ecosystem

- Pollination Aids
- Food Chain

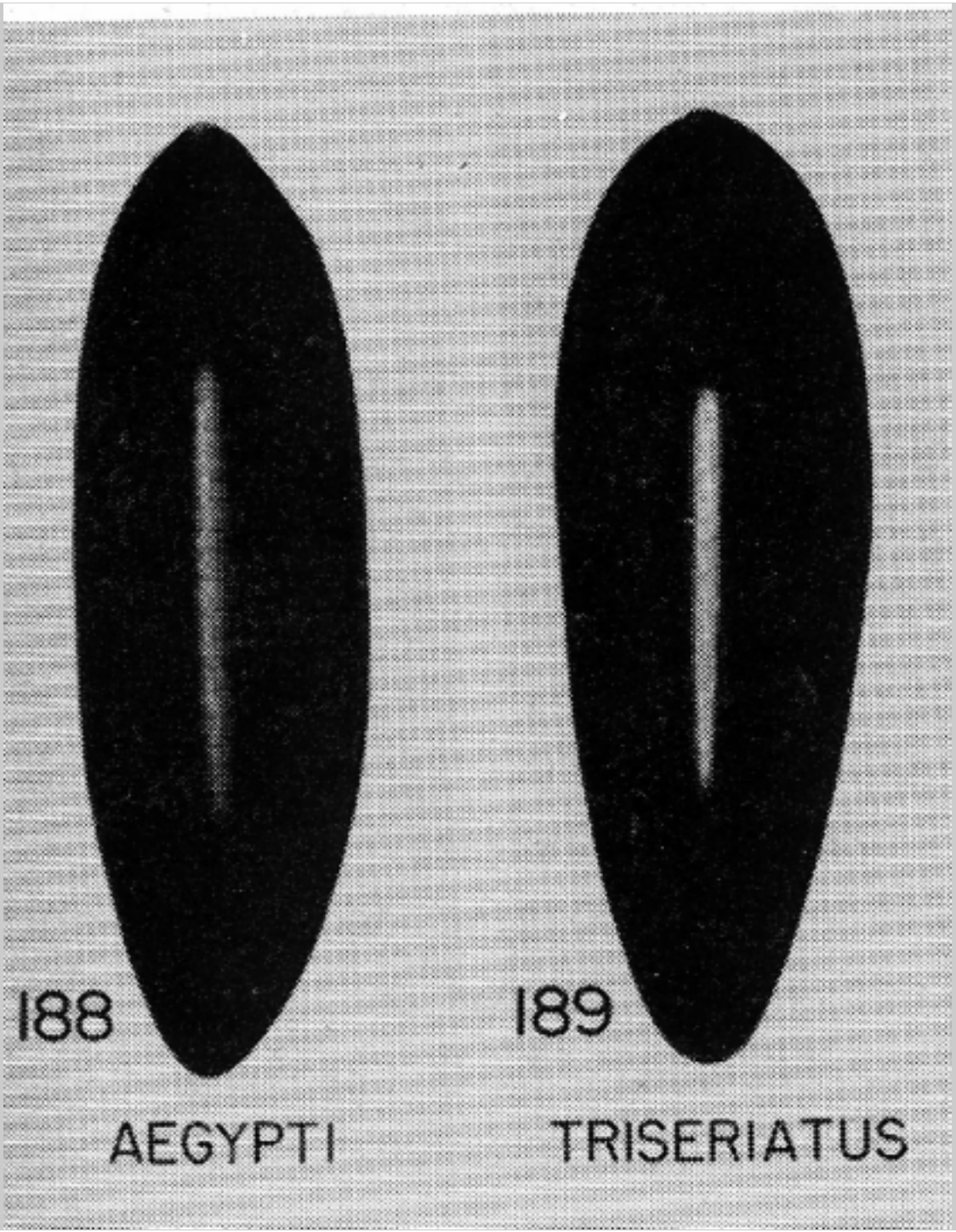
Mosquito Life Cycle

- Egg
- Larva
- Pupa
- Adult



The Egg

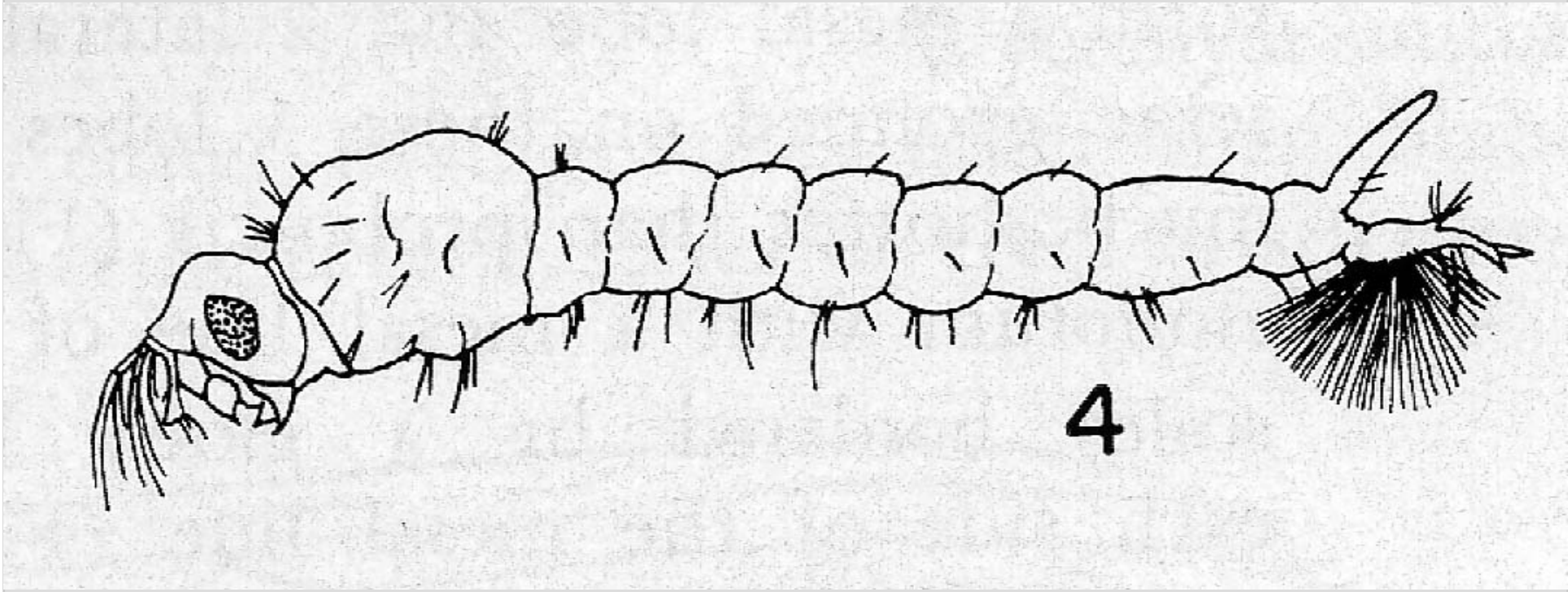
- High sensitivity to Humidity
  - Levels trigger hatching
- Temp. viability -10C to 50C


188
189
AEGYPTI
TRISERIATUS

The Larva

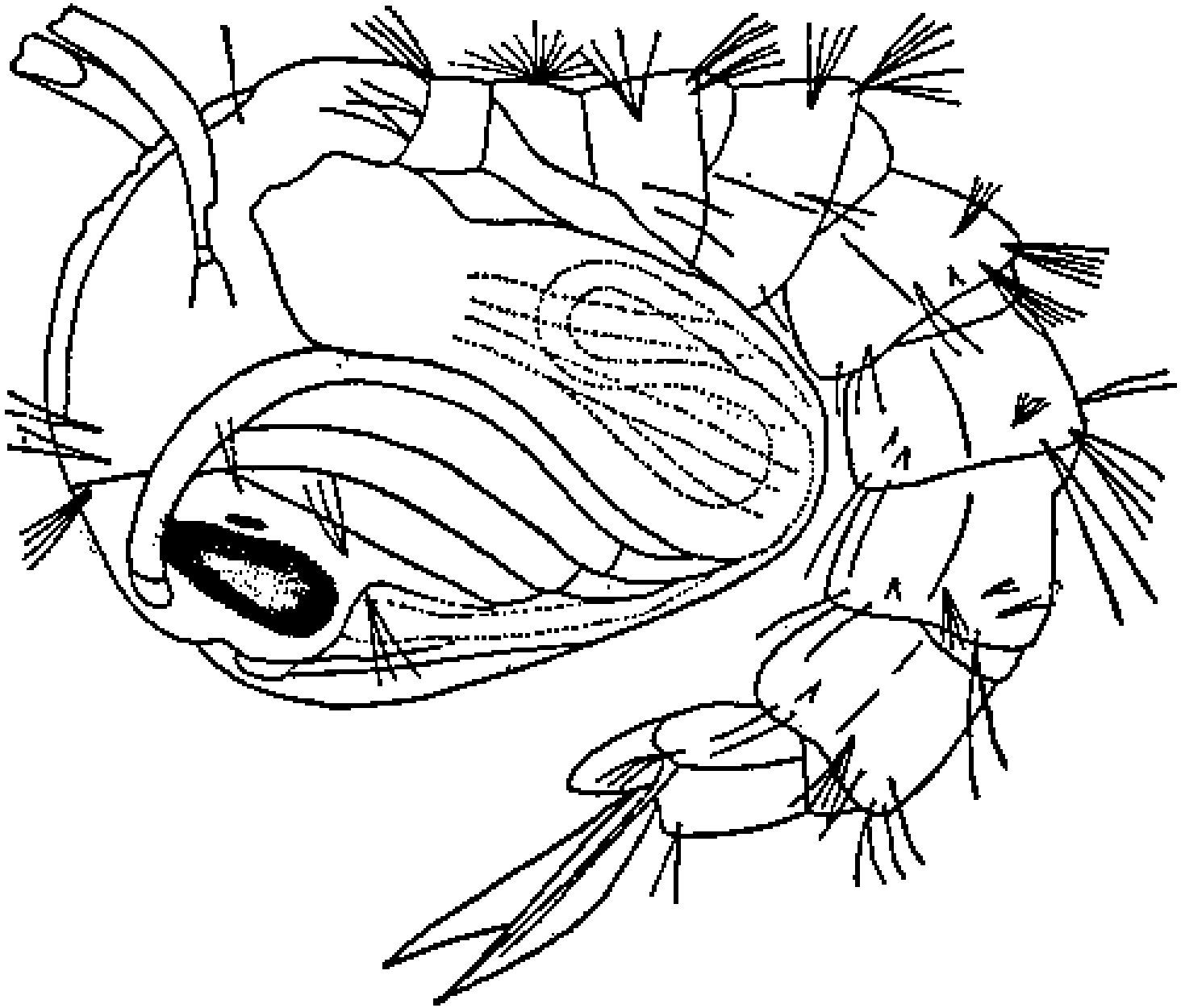
- Hardy
- Four instars
  - Represented by molting
- Gravitropic

Mosquito Larvae



The Pupa

- Complete metamorphosis
  - Imaginal Clusters
- Non-feeding



Adult: Physiological Aspects

- Development complete
- Similar to other aerial insects

Adult: Behavioral Aspects

- Feed on nectar
- Blood for egg proteins.
- Accurate flight

Experiments: Phase 1

- STS-80 & STS-85
- Eggs placed in passive tube
  - Humidity control system

Experiments: Phase I

- Hypothesis
  - Eggs will be unaffected
- Results
  - STS-80: Mold and Prehatching
  - STS-85: Prehatching with limited Viability

Experiments: Phase I

- Lessons learned
  - Biological samples are difficult to maintain
  - Humidity control
    - Filter paper
  - Sterilized on STS-85

Experiments: Phase II

- STS-85 (Active)

- Eggs in airtight chamber
  - Humidity control system
  - Water/Fixative injection system
  - Heater activated and water injected

Experiments: Phase II

- Hypothesis
  - Larval disorientation
  - Possible mutations
- Results
  - Mechanically Unsuccessful

Experiments: Phase II

- Lessons learned
  - Spring loaded injection replaces pump
  - Professionally made heater circuit

Experiments: Phase III

- Long duration mission (Future)
- Add on to Phase 2
- Develop correctly, controlled flight

Conclusion

- Experimentation not over
- Skill development
  - Communications skills
  - Writing skills
  - Mechanical/Engineering skills
  - Scientific method and process
  - Process and product

Thank You!